NASA SBIR/STTR Technologies

S4.01-7996 - Speed Sensor for Planetary EDL: "SPRY"

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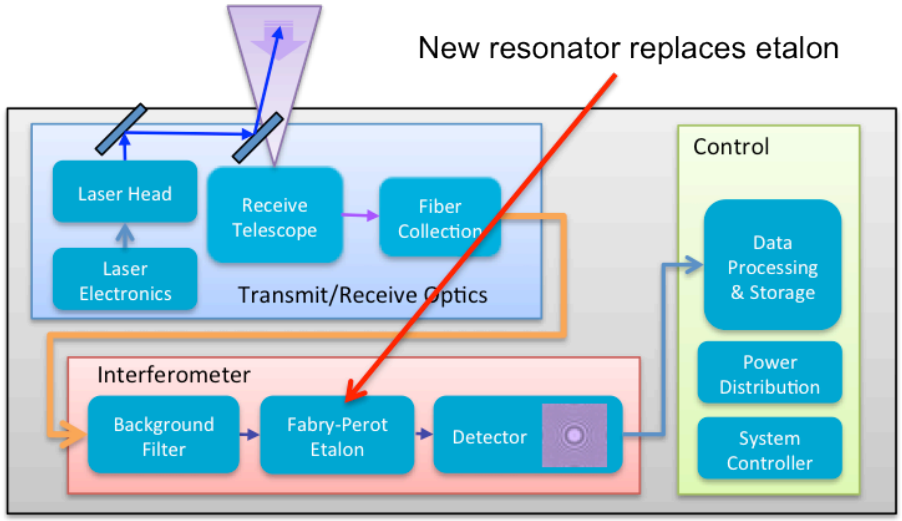
Identification and Significance of Innovation

The goal of this Phase I and Phase II efforts is to develop a micro atmospheric data sensor suitable for planetary entry, descent, and landing (EDL) maneuvers, in response to NASA's S4.01 Planetary Entry Descent and Landing. Michigan Aerospace Corporation (MAC) is proposing to develop a compact, rugged optical atmospheric data sensor capable of measuring free stream velocity during EDL; this sensor will use a novel microresonator approach as part of its light processing path, allowing unprecedented compactness and ruggedness. Phase I will entail the design and preliminary demonstration of the concept. A prototype atmospheric data sensor will be fabricated in Phase II and tested using a calibrated flow field.



Estimated TRL at beginning and end of contract: (Begin: 2 End: 3)

Technical Objectives and Work Plan

Technical Objectives:

- **Objective 1:** Define the operational parameters of the instrument.
- **Objective 2:** Design of the micro resonator.
- **Objective 3:** Design the full instrument for prototype fabrication and testing in Phase II.
- **Objective 4**: Assessment of the measurement accuracy.

Work Plan:

- **Task 1:** Requirement Definition
- **Task 2:** Trade Studies
- **Task 3:** Resonator Design
- **Task 4:** Algorithms
- **Task 5:** Instrument Design
- **Task 6:** Management *(throughout project)*

NASA Applications

NASA's planetary exploration program will benefit from this effort by having a new, compact method to sense airspeed and atmospheric conditions during atmospheric entry for navigation and scientific purposes. In addition, this compact air data sensor will be applicable to small, unmanned UAVs and aeronautics high-speed programs.

Non-NASA Applications

The commercial applications for this compact air/atmospheric data sensor are widespread. Such a small sensor will be usable on UAVs, commercial aircraft, and also hypersonic vehicles where protrusion into the free stream is not an option. MAC has extensive LIDAR and optical air data systems programs, which will profit from a smaller, more rugged sensing element.

Firm Contacts

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